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Application for Patent on

Compact Toothbrush Assembly

by

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**Field of the Invention**

The invention relates to a toothbrush having an integral dentrifice supply.

**Background and Summary of the Invention**

A number of toothbrushes are known, including some featuring integral dentrifice supplies, including, for example, toothpaste supplies. Some toothbrush designs include those disclosed in U.S. Patent Nos. 4,693,622; 5,382,107; 5,144,712; 4,467,822; 5,464,294; 5,476,334; and 5,439,014. However, many such toothbrushes are complex in design and therefore difficult to manufacture economically. They also have designs that may be inconvenient for travel and for carrying in a compact space, such as a pocket of an article of clothing.

There remains a need for a simple, portable toothbrush that is compact and portable and useful for travel. The invention disclosed herein provides a toothbrush and toothpaste holder that is compact, can be manufactured at sufficiently low cost to be disposable.

It is one object of the invention to provide a compact toothbrush containing its own supply of toothpaste. The combined toothbrush toothpaste dispenser can have dimensions similar to that of a credit card and have a thickness of several credit cards, allowing for placement in a shirt pocket, travel kit or other place in which space is at a premium. The toothbrush of the invention also provides other benefits including the inclusion of a mirror useful, for example, for cosmetic application. The substantially flat surfaces of the body also provide a large area suitable for printing of graphics, advertisements or other information.

In accordance with the present invention, a toothbrush assembly is provided that has a body with a reservoir disposed therein for containing a dentrifice, for example toothpaste. A hollow handle member is connected to the body such that a channel within  
5 the handle is in fluid communication with the reservoir. The connection is made through a hinge region, which included both rotatably mounted hinges and flexible hinges. The hinge can include a valving mechanism that closes the fluid connection between reservoir and handle, or can always be in the open position. The invention also can have a second handle member that is connected to the first handle member through a second hinge. The  
10 body of the toothbrush assembly is made from a pliable material that allows pressure to be applied to the reservoir to force toothpaste from the reservoir through the handle and out apertures in the brush head, allowing toothpaste to emerge at the brush head. The toothbrush assembly also can contain a dental floss holder for dispensing dental floss. Allowing a user to carry a complete dental kit in a compact and disposable package.

15 The toothbrush assembly of the invention can be formed from any suitable material, but for economy and disposability the assembly is most preferably formed from a plastic material. Some suitable plastics include polyethylene, polypropylene, and polystyrene.

## 20 **Brief Description of the Drawings**

FIG. 1 is a side view of one embodiment of the invention in the folded position.  
FIG. 2 is a side view of the toothbrush of FIG. 1, with the handle in an extended position.  
FIG. 3 is a longitudinal sectional view of the toothbrush.  
FIG. 4 is a sectional view of a toothbrush of the invention.  
25 FIG. 5 is a side view showing a toothbrush of the invention in the closed position.  
FIG. 6 is a top view of the toothbrush in FIG. 5.  
FIG. 7 is a side view with a partial sectional view, showing a toothbrush of the invention having hinges.  
FIG. 8 is a top view of the toothbrush in FIG. 7.  
30 FIG. 9 is a side view, partially sectional, of a hinge in a closed position.  
FIG. 10 is a side view, partially sectional, of a hinge in an extended position.

FIG. 11 is a side view of a toothbrush having a single hinge.

FIG. 12 is a transverse sectional view of the toothbrush in FIG. 11.

FIG. 13 is a back side view of a toothbrush of the invention.

FIG. 14 is an exploded view of a hinge region of a toothbrush of the invention.

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### **Detailed Description**

Referring to FIG. 1, FIG. 2, FIG. 3 and FIG. 4 of the drawings, the toothbrush of the invention includes a substantially rectangular body **200** having a reservoir **205** for  
10 containing a dentrifice, for example, toothpaste, disposed therein. Body **200** is attached to handle member **140** through hinge region **150**. Handle member **140** has a channel **145** disposed therein in fluid communication with reservoir **205**. A second handle member **120** is attached to the first handle member in this embodiment through hinge region **130**, the handle member **120** having a channel **125** disposed therein in fluid communication  
15 with channel **145** through a channel disposed in hinge region **130**. In the embodiment shown in FIGS. 1-4, the hinge regions are molded from the same material as body **200** and handle members **120** and **140**, but have geometries and material thicknesses that allow bending from a closed to open position. The toothbrush can have an toothpick device **500** integral to body **200**.

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At the distal end of the handle members from body **200**, is the brush head **110**, having a brushing surface attached thereto. The brushing surface can be, for example, a plurality of bristles **100**. The brush head has one or more apertures **105** that connect channel **125** to the surface of the brush head to which the bristles **100** are attached. Body **200** is  
25 preferable formed of a pliable or deformable, or otherwise elastic material that allows pressure to be applied to reservoir **205**, forcing toothpaste through channels **145** and **125**, through aperture **105** to the brushing surface of brush head **110**. The body **200** of the toothbrush can be extended to cover partially the bristles **100** and/or the handle members **140** and **120**. In FIG. 1 and FIG. 2, body extension **160** extends over handle member  
30 **140**, holding it in a closed position, and body extension **170** extends over handle member **120**, holding it in a closed position. The body extensions preferably engage the handle

members through friction to hold the handle members firmly in place. As shown in FIG. 3 and FIG. 4, the body extension **170** also can extend to form a cavity for guarding the brush head cleaning surface and bristles **100**.

- 5 FIG. 5 and FIG. 6 show a similar embodiment in which body extensions **160** and **170** extend to cover handle members **120** and **140**, thus providing a compact package having substantially rectangular front and back sides.

10 The rectangular shape of the toothbrush of the invention makes it particularly well suited for use as a mirror. One or both surfaces can be coated with a reflective material, for example a metal foil, to provide a reflective surface. The general size of the apparatus also is well suited to the application of promotional graphics. The general dimensions of the toothbrush are similar to that of a standard credit card (about 5.4 cm by about 8.5 cm) although a bit thicker. Such a size is well suited to the display of graphics such as would  
15 normally be found on a business card, enabling use of the toothbrush as a promotional give away. The flat surface of the body **200** also is well suited to standard and inexpensive printing techniques.

FIG. 7 shows an embodiment of the toothbrush in which the body **200**, handle member  
20 **140**, and handle member **120** are separate pieces linked through hinges **130** and **150**. FIG. 7 includes a spool **400** rotatably mounted within a cavity **390** in the body for holding dental floss **410**. The spool can rest on protrusion or protrusions from the body **405**, allowing it to spin freely. An aperture is provided to allow the dental floss to exit the body. For convenience, a dental floss cutter **420** can be included on the exterior of  
25 the body. The cutter can be fabricated from any suitable material, but preferably contains a metal, ceramic or other hard and sharp material for cutting the dental floss. In another embodiment, dental floss is provided within a cavity in the body, but is not wound on a spool. The floss can be pulled through the aperture in the body wall and cut. When the product is shipped, it is preferable to secure the floss with a small piece of adhesive tape  
30 to allow the free end to remain accessible to the user. The floss also can be supplied in a number of pre-cut pieces or pieces that have been at least partially cut to allow their

removal from the device without the necessity to cut it. Cavity **390** or an additional cavity can be provided for holding and dispensing a liquid dentrifice, including, for example, mouthwash. In such an embodiment, the aperture provided will include a means for sealing the aperture to provide a substantially leak-proof container. One such  
5 means is an adhesive tab. As the device can be manufactured to be disposable, the tab can be made so the user can remove the adhesive tab for a single use. Other suitable means include any variety of plugs, including threaded and non-threaded plugs.

In such an embodiment, the hinges also can serve as valves, preventing flow of toothpaste  
10 through the channels **125** and **145**. Hollow convex end **155** of handle member **140** fits into concave end **128** of handle member **120**. In the closed position (FIG. 9), aperture **146** in convex end **155** opens against concave end **128**, blocking fluid communication between channel **145** and channel **125**. In the open position (FIG. 10), aperture **146** is  
15 aligned with aperture **126** in concave end **128**, bringing channels **145** and **125** into fluid communication.

Another embodiment of the invention is shown in FIG. 11, FIG. 12, FIG. 13, and FIG. 14. In such an embodiment, single handle member **120** is attached to body **200**, through a hinge mechanism **132**. The body **200**, upper body **300** and handle **120** collapse to give  
20 a substantially flat package. Back surface **240** of the body is substantially flat and suited for coating with a reflective material as is front surface **220** of body **200**. Graphics, text or other promotional material can be printed on either or both the front and back surfaces. FIG. 14 shows an exploded view of a hinge suitable for use with the toothbrush shown in FIG. 11-13. Hollow hinge member **132** connects channel **125** to reservoir **205** through  
25 apertures **133** and **134**. Hinge member **132** sits in hinge seat **138** and can rotate from a closed position in which handle member lies in a groove lying between body **200** and upper body **300**. In the extended or open position, aperture **133** is aligned with aperture **134**, allowing flow of toothpaste from reservoir **205** through hollow hinge member **132**, through channel **125** disposed in handle member **120**, allowing paste to exit aperture **105**  
30 in brush head **110**. FIG. 11 also shows a toothbrush having a recess **510** disposed within body **200** that can hold a toothpick **520**. In this embodiment, the toothpick is removable

and locks in place by a simple friction fit; however, the toothpick could also be slidably engaged with the pointed side outward, and not be removable. In such an embodiment, the recess could form an open channel in body **200** and the toothpick could include a protrusion that allowed deployment of the toothpick from the closed position to an open position.

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